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Prioritätsbescheinigung über die Einreichung einer Patentanmeldung

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Die angehefteten Stücke sind eine richtige und genaue Wiedergabe der ursprünglichen Unterlagen dieser Patentanmeldung.

München, den 4. Juli 2003
Deutsches Patent- und Markenamt
Der Präsident
Im Auftrag

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Control for a roof assembly of a vehicle, roof assembly and method of controlling a roof assembly

The invention relates to a control for a roof assembly of a vehicle, such roof assembly and a method of controlling a roof assembly according to the preambles of claims 1, 8 and 9.

Such control, roof assembly and method of this kind are known from DE-C-44 11 388 (US-A-5,749,617). Other examples of prior art controls are known from DE-A-199 26 521 and US-A-6,056,352.

The object of the present invention is to provide an improved control, roof assembly and method of the type referred to in the introduction.

The control, roof assembly and method according to the invention are characterized by the features of claims 1, 8 and 9, respectively.

According to the invention there is a separation between selection of the roof position and activation of the control unit which leads to a more fool proof and reliable operation of the roof assembly since the roof members start only moving after a selection of the end position has been made.

It is preferred to construct the switch itself as a push-button which is actuated in a direction substantially perpendicularly to the range of adjustment of the switch. In this manner, there is no need for a separate push-button, which is a cheap solution and which leads to a very simple and comfortable control.

In order to be able to stop the roof members in intermediate positions, it is proposed according to the invention to program the control unit such that it is deactivated when the push-button is depressed during movement of the roof member(s) to their pre-selected position, while it is preferred to program the control unit such that it is activated again when the push-button is depressed in a position of the roof members in which they have

not yet reached their pre-selected position indicated by the switch.

In this manner the user of the roof assembly may obtain more (intermediate) positions of the roof members than selectable by the switch.

I case the control is provided with a pinch safety system for the roof members, it is a preferred option to program the control unit such that the pitch safety system is overridden if the push-button is held during movement of the roof members.

It this way it possible to close the roof members, also in situations in which the pinch safety system would prevent closing, for example if the resistance on the roof members is too high due to dirt, misalignment or other undesired causes.

The invention will be explained in more detail hereafter with reference to the drawings showing an embodiment of the roof assembly and control according to the invention.

Fig. 1 is a scheme showing parts of the roof assembly and the control for controlling the roof assembly.

Fig. 2 is a plan view of a switch for use in the control according to Fig. 1.

The drawings show an embodiment of a roof assembly for a vehicle and a control therefore. In this particular embodiment, the roof assembly includes a front panel 1 and a rear panel 2 as well as a front sunshade 3 and a rear sunshade 4. It will be obvious that all kinds of other arrangements of rigid or flexible, transparent or non-transparent roof members are conceivable. The roof members may also be part of a convertible roof. In this embodiment all roof members 1-4 have their own electric motors 5 each connected to a power source such as a battery (not shown) and connected to a control unit 6 which is adapted to provide control signals to the electric motors 5 in a programmed manner.

A control element 7 in the form of a switch is connected to the control unit 6 to provide input signals to the control unit 6. The switch 7 is in this case constructed as a rotary switch, which also has a push-button function. The rotation of the switch

7 is used to make selections for the control unit 6, whereas the push-button function of the control element 7 is used to activate and deactivate the control unit 6. The input signals from the control element 7 to the control unit 6 may be generated in any known way, for example by micro-switches or the like.

Figure 2 shows the switch 7 in a plan view and it shows a grip part 8, which can be gripped by the fingers of a hand in order to press or rotate the switch 7. Around the switch 7 there is provided a ring showing pictograms 9. These pictograms 9 each show a different position of the roof members of the roof assembly, to which position the control unit 6 will move the roof members 1-4 by their electric motors 5 when a mark 10 on the grip part 8 of the switch 7 is aligned with this particular pictogram. The switch is provided with means to click the switch between the pictograms so that the positions of the pictograms are sensed in a tactile manner.

The method of controlling the roof assembly by means of the control is as follows.

The user first selects from the pictograms 9 a position for the roof members 1-4 of the roof assembly. Then the switch 7 is rotated such that the mark 10 is aligned with the selected pictogram 9 corresponding to the desired position. The switch 7 is then depressed in order to activate the control unit 6 which transmits output signals to the electric motors 5 in order to have them move their respective roof members 1-4 to the selected position. If the user wishes to stop the roof members 1-4 from moving before the selected position is reached, the user can depress the switch 7 again in order to deactivate the control unit 6. The roof members of the roof assembly will then remain in the position which was occupied during actuation of the push-button. Depressing the push-button of the control element 7 again will reactivate the control unit 6 and the roof members 1-4 will continue moving until the pre-selected position is reached.

If another position of the roof members is desired, the switch 7 is rotated to the other desired position shown on

pictogram 9 and depressed again to start movement of the roof member(s) 1-4 to the other pre-selected position. In this manner the movements of the roof members of the roof assembly are only started when a final selection has been made and the control unit 6 is then transmitting the necessary output signals to obtain this position.

If the roof assembly is equipped with a pinch safety system which prevents parts of the body or objects to be pinched when a roof member 1-4 is moved to the closed position, it may be desirable to have a hold function of the push-button of the switch 7. In this way the pinch safety system is overridden and the roof members are moved to the desired position without interference of the pinch safety system. Especially if this function is used to close all roof members it is possible that the speed of the roof member is increased to close the roof assembly quickly. This may be useful in case of unwanted people trying to get access to the vehicle through the opening of the roof assembly.

The invention is not restricted to the above-described embodiment as shown in the drawing, which can be varied in several ways without departing from the scope of the invention. It is for example possible to construct the switch as a slide. The push-button may be a separate button positioned on or next to the switch.

CLAIMS

1. A control for a roof assembly of a vehicle, said roof assembly including several roof members (1-4) which are individually drivable by drive motors (5), said control comprising a control unit (6) programmed to control said drive motors (5), and a switch (7) having a range of adjustment with pre-selected positions each corresponding to a pre-selected position of the roof members, **characterized in that** said switch (7) is provided with a push-button function activating the control unit (6) to energize one or more of said drive motors (5) to move one or more of said roof members (1-4) to the position corresponding to said pre-selected position of said switch (7).

2. A control according to claim 1, wherein said switch (7) is a push-button actuated in a direction substantially perpendicularly to the range of adjustment of the switch.

3. A control according to claim 1 or 2, wherein the control unit (6) is programmed such that it is deactivated when the push-button is depressed during movement of the roof member(s) (1-4) to their pre-selected position.

4. A control according to claim 3, wherein the control unit (6) is programmed such that it is activated again when the push-button is depressed in a position of the roof members (1-4) in which they have not yet reached their pre-selected position indicated by the switch (7).

5. A control according to any of the preceding claims, provided with a pinch safety system for the roof members (1-4), the control unit (6) being programmed such that the pinch safety system is overridden if the push-button is held during movement of the roof members (1-4).

6. A control according to any of the preceding claims, wherein the switch (7) is constructed as a rotary switch.

7. A control according to any of the preceding claims, wherein the pre-selected positions of the switch are sensible in a

tactile manner.

8. A roof assembly for a vehicle, said roof assembly comprising several roof members (1-4) which are individually drivable by drive motors (5), a control including a control unit (6) programmed to control said drive motors (5), and a switch (7) having a range of adjustment with pre-selected positions each corresponding to a pre-selected position of the roof members (1-4), **characterized in that** said switch (7) is provided with a push-button function activating the control unit (6) to energize one or more of said drive motors (5) to move one or more of said roof members to the position corresponding to said pre-selected position of said switch (7).

9. A method of controlling a roof assembly of a vehicle, said roof assembly including several movable roof members (1-4) which are individually drivable by drive motors (5), said method including the steps of:

providing a control comprising a control unit (6) programmed to control said drive motors (5),

moving a switch (7) of said control to one of a set of pre-selected positions corresponding to one of a set of pre-selected positions of the roof members (1-4),

depressing a push-button activating the control unit (6) to energize one or more of said drive motors (5) to move one or more of said roof members (1-4) to the position corresponding to said pre-selected position of said switch (7).

10. A method according to claim 9, wherein the push-button function is activated by depressing the switch (7).

ABSTRACT

The invention relates to a control for a roof assembly of a vehicle, in which said roof assembly includes several roof members (1-4) which are individually drivable by drive motors (5). The control comprises a control unit (6) programmed to control said drive motors (5), and a switch (7). It has a range of adjustment with pre-selected positions each corresponding to a pre-selected position of the roof members. This switch (7) is provided with a push-button function activating the control unit (6) to energize one or more of said drive motors (5) to move one or more of said roof members (1-4) to the position corresponding to said pre-selected position of said switch (7).

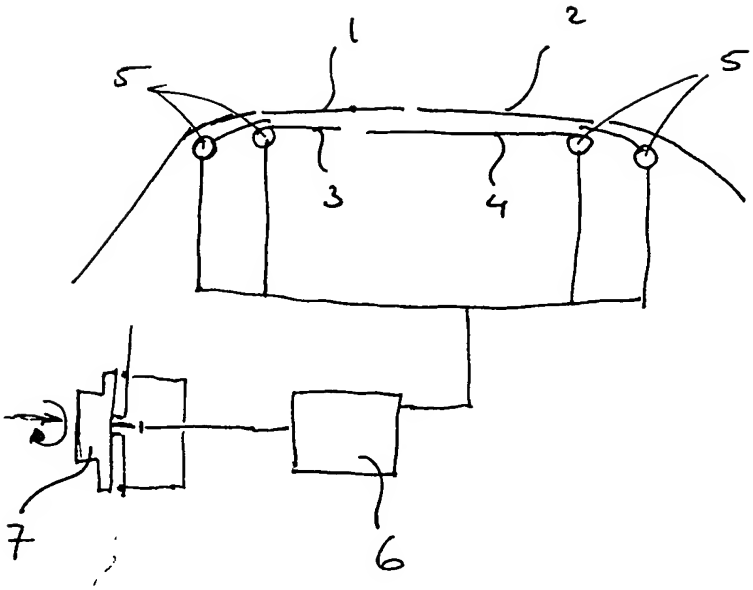

FIG. 1

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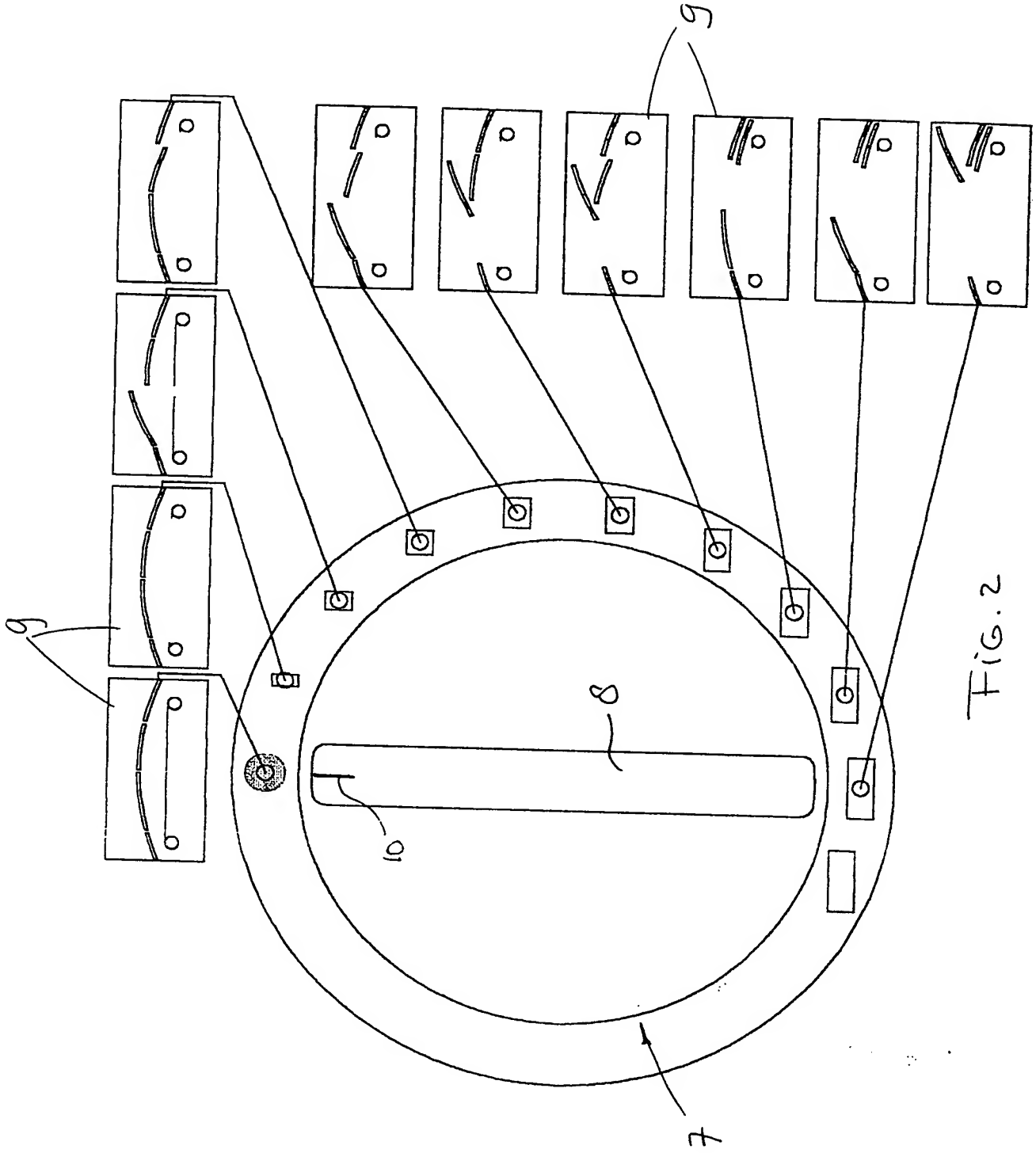

FIG. 2

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